We can first find the transformation that can match the border of one image to the other, using “imregtform”. Then apply it on our whole image using “imwarp”. Please see Figure 4 (right) to see the result.

I know that sometimes what I think can improve the image appearance is not what experienced researchers prefer. Sometimes they can see things in the original images that they can’t see in modified images. So, I was a little cautious about modifying the histogram of images.

I tried several techniques. Finally, I came to “adapthisteq”. First, I draw histograms of our original images (I cropped black areas before drawing histogram). The results were like this:



Figure - histogram of image 22 in group 57.

I tried several other images, both in group 11 and group 57 and all of them had histograms like Figure 1. Except that sometimes the distribution’s peak doesn’t look that good (please see Figure 2).



Figure 2- histogram of image 23 in group 57.

I thought they all look like Rayleigh distribution. So, I tried to make a little bit smoother. Here is the result.

 

Figure 3- Left: modified histogram of image 22 in group 57. Right: modified histogram of image 23 in group 57.

There was a little problem in here. The green boxes in Figure 3 represent pixels that were zero in original images (please see green boxes in Figure 1 and Figure 2) which are now shifted to the right. Most of these pixels represent black regions around the main parts of the images. So, I turned them back to black after histogram modification. Then I merged the images. In Figure 4, the left image shows the result of merging image 22 and 23 without histogram modification. And the right image shows the result of merging image 22 and 23 after histogram modification. I don’t know which one do you prefer.

 

Figure 4- Left: the result of merging image 22 and 23 in group 57 without histogram modification. Right: same as the image in the left, but after histogram modification.